

What is claimed is:

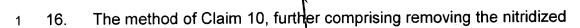
- 1 1. A method of forming a transistor, comprising:
- forming a silicidation barrier on a patterned polysilicon layer;
- implanting dopants to form a source/drain extension layer self-aligned to
- 4 the patterned polysilicon;
- forming a first silicide layer over the source/drain extension layer;
- forming sidewall spacers adjacent to the patterned polysilicon;
- 7 removing a portion of the silicidation barrier from a top surface of the
- 8 patterned polysilicon;
- forming a second silicide layer self-aligned to the sidewall spacers; and
- forming a third silicide layer on a top surface of the patterned polysilicon.
- 1 2. The method of Claim 1 wherein the second silicide layer and the third
- 2 silicide layer are formed concurrently.
- 1 3. The method of Claim 1, wherein forming a silicidation barrier comprises
- 2 nitridizing the patterned polysilicon layer.
- 1 4. The method of Claim 1, wherein forming the silicidation barrier comprises
- 2 forming a silicon nitride layer on a top surface of the patterned polysilicon, and
- on at least one sidewall of the patterned polysilicon



- 1 5. The method of Claim 1, wherein the silicidation barrier has a thickness
- 2 sufficient to prevent silicidation of the polysilicon.
- 1 6. The method of Claim 1, further comprising depositing a layer of metal over
- the source/drain extension layer, wherein the metal is selected from the group
- 3 consisting of titanium and cobalt.
- 1 7. The method of Claim 6, wherein further comprising depositing a layer of
- 2 metal over the first silicide layer, wherein the metal is selected from the group
- 3 consisting of nickel and cobalt.
- 1 8. The method of Claim 1, wherein the second and third silicide layers
- 2 comprise nickel silicide.
- 1 9. The method of Claim 1, further comptising implanting dopants through the
- 2 first silicide layer to form source/drains self-aligned to the sidewall spacers.
- 1 10. A method of forming a microelectronic device, comprising:
- forming a patterned polysilicon layer over a dielectric layer, the dielectric
- 3 layer disposed on a substrate, the patterned polysilicon having sidewalls and a
- 4 top surface;
- nitridizing the sidewalls and top surface of the polysilicon;

- implanting first dopants into the substrate to form a source/drain extension layer;
- forming a first silicide layer over the source/drain extension layer;
- 9 forming sidewall spacers adjacent to the sidewalls;
- implanting second dopants through the first silicide layer into a
- 11 source/drain region; and
- forming a second silicide self-aligned to the sidewall spacers.
- 1 11. The method of Claim 10, further comprising thermally activating the first
- 2 dopants prior to implanting the second dopant atoms.
- 1 12. The method of Claim 10 wherein the first and second silicides comprise
- 2 different metals.
- 1 13. The method of Claim 10 wherein the first and second silicides comprise
- the same metal.
- 1 14. The method of Claim 10 wherein nitridizing the polysilicon produces a
- 2 silicon nitride layer approximately 10 angstroms thick.
- 1 15. The method of Claim 10, further comprising forming an agglomeration-
- 2 free silicide layer over the patterned polysilicon.

3



- 2 portion of the top surface of the gate electrode.
- 1 17. The method of Claim 10, wherein the second silicide layer is formed
- 2 through the first silicide layer.
 - 18. A microelectronic structure, comprising:
 - a gate electrode having sidewalls;
 - a silicidation barrier adjacent to the sidewalls;
- a first silicide layer superjace of the gate electrode; and
- a pair of source/drain terminal self-aligned to the gate electrode;
- 6 wherein the source/drain terminals comprise a first implanted region, a second
- 7 silicide layer; a second implanted regions and a third silicide layer.
- 1 19. The microelectronic structure of Claim 18, wherein the second silicide
- 2 layer is contained within the first implanted region.
- 1 20. The microelectronic structure of Claim 18, wherein the third silicide layer is
- 2 thicker than the first implanted region.